App. No. 10/522,887
Office Action Dated September 18, 2007

Amendments to the Drawings:

The attached sheets of drawings include replacements for Figures 1A, 1B, 1C, 2A, 2B, 3A, 3B and 3C.

Attachment: Replacement Sheets 1-6

App. No. 10/522,887
Office Action Dated September 18, 2007

REMARKS

Favorable reconsideration is respectfully requested in view of the above amendments and following remarks. The specification has been amended to address formal issues. Proposed amendments to the drawings are submitted herewith to correct formal issues. Claims 17-20 and 23-25 have been amended. Claims 17-20 and 25 have been amended editorially. The limitation in claims 23 and 24 concerning the transgenic rice variety producing 30-95% increase in SOD activity is supported for example by Figure 1A. Claims 21-22 and 26-28 have been canceled without prejudice or disclaimer. No new matter has been added. Claims 17-20 and 23-25 are pending.

Specification

The specification has been amended to address the issues noted in the rejection. Particularly, the abstract has been amended to address formalities. A section for Brief Descriptions of the Drawings has been added. With the proposed amendments, Applicants respectfully submit that the specification is in proper form.

Drawings

Applicants hereby present proposed amended drawings to remove the frames from the figures. Particularly, 1A, 1B, 1C, 2A, 2B, 3A, 3B and 3C have been amended. With the proposed amendments, Applicants respectfully submit that the drawings are in proper form.

Claim Objections

Claims 17-20 and 23-26 have objected to because of informalities. Claims 17-20 and 23-26 have been amended, taking the issues noted in the objection into account.

Withdrawal of the objection is respectfully requested.

Claim rejections - 35 U.S.C. § 112

Claims 17-20 and 23-26 are rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 17-20 and 23-25 have amended, taking the issues noted in the rejection into account.

Withdrawal of the rejection is respectfully requested.

App. No. 10/522,887
Office Action Dated September 18, 2007

Claim rejections - 35 U.S.C. § 103

Claims 17-20 and 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bowler et al. (European Patent Publication No. EP 0359617A2) in view of Tanaka et al. (Plant Science, 148: 131-139, 1999). Applicants respectfully traverse the rejection.

Claim 1 is directed to a method for producing a transgenic Indica rice variety. The method involves constructing an expression vector for plant transformation containing a promoter, MnSOD coding sequence, and a transit peptide coding sequence, wherein the promoter, the transit peptide coding sequence and the MnSOD coding sequence are operably linked. The method further involves transforming rice of the Indica rice variety with the vector construct, and then regenerating the transformed calli into mature transgenic plants of the Indica rice variety. As indicated in Figures 1A to 1C, the mature transgenic plants of the Indica rice variety obtained by the method according to claim 1 exhibited higher levels of SOD activity, SOD protein and catalase activity as compared to non-transgenic plants of the same variety (see page 9, lines 1-10 of the specification). The transgenic plants of claim 1 also exhibited healthier chloroplasts as compared to control plants even under Methylviologen (Paraquat) treatment (Id).

Bowler is directed to a method of making a transgenic plant. The method disclosed by Bowler involves stably transforming a plant cell genome using a recombinant SOD gene containing a promoter operably linked to a SOD gene. The reference further discloses that the recombinant SOD gene may contain a foreign promoter, such as the promoter of the 1A small subunit gene of 1,5 ribulose bisphosphate carboxylase (Rubisco) of *Arabidopsis thaliana.* However, the only working example Bowler teaches is the transformation of *Arabidopsis thaliana*, which is a dicotyledonous plant, as opposed to a monocotyledonous plant. The reference further teaches that the *Arabidopsis* is transformed with a Ti-plasmid used for the transformation of all plants susceptible to Agrobacterium infection, such as *Nicotiana plumbaginifolia, Arabidopsis thaliana Noctiana tabacum, Solanum tuberosum, Lycopersicum esculentum, Medicago sativa* and *Beta vulgaris*, all of which are dicotyledonous plants. Applicants respectfully note that monocotyledonous plants and dicotyledonous plants have diverged significantly and may display differences in response to perturbations such as stress and may respond differently to transgenic events such as a plastidic localization of MnSOD. As such,

the reference is far from teaching or suggesting the step of transforming a monocotyledonous plant, such as Indica rice. Accordingly, claim 1 is patentable over Bowler.

The rejection relies on Tanaka for the transformation of an Indica rice plant with a chloroplast targeted SOD coding sequence. The rejection's reliance is misplaced. The rejection first contends that Tanaka teaches making a transgenic plant cell of rice with increased SOD production, and that the transgenic plant obtained exhibits higher levels of SOD production and increased tolerance to environmental stresses. The rejection then argues that it would have been obvious to modify the method of making a stress-tolerant transgenic plant as taught by Bowler by transforming any cultivated rice variety including an environmentally stress (salt) sensitive indica rice variety with Bowler's DNA construct to obtain the transgenic indica rice variety expressing SOD.

Applicants first note that Tanaka examines the role of SOD in Sasanishiki, which is a Japonica as opposed to an Indica rice plant (see page 132 under Material and Methods). It has been well established that Indica and Japonica groups can be separately classified under Oryza sativa based on physiological and morphological traits including drought tolerance, potassium chlorate resistance, phenol reaction, plant height and leaf color (Oka et al., 1958, 1988). Moreover, there are numerous reports which reveal distinct genetic patterns between Indica and Japonica, suggesting that the two actually evolved from distinct ancestral gene pools (Thompson et al., 2002). There are in fact large differences in physiological traits between Japonica and Indica. For example, studies have shown that Indica rice exhibits higher transpiration rates than Japonica rice (Peng et al., 2006). Such differences allow the plants to thrive in different growth habitats such as lowlands of tropical Asia (Indica) and upland hills of southern China and Indonesia (Japonica). Given such differences, there is no reasonable basis from Tanaka itself to conclude that Tanaka's studies in Sasanishiki would lead to a predictable application in Indica rice variety, let alone any cultivated rice variety besides Sasanishiki. In fact, Tanaka notes that correlations of salt tolerance with antioxidant enzyme levels have remained controversial (see page 136 under Discussion). Tanaka also notes that studies on salt tolerances of transgenic plants overexpressing SOD has only been reported by Van Camp et al., whose studies were limited to tobacco plants (Id). As such, Tanaka is far from suggesting that transforming Indica rice variety, let alone any variety besides Sasanishiki, would result in a transgenic plant with

App. No. 10/522,887
Office Action Dated September 18, 2007

resistance to salt stress. Therefore, even when considered together, Bowler and Tanaka fail to direct one of ordinary skill to the steps of transforming rice of the Indica rice variety with an expression vector containing a promoter, MnSOD coding sequence, and a transit peptide coding sequence, and then regenerating the transformed calli into mature transgenic plants of the Indica rice variety as required by claim 1. Accordingly, claim 1 and the dependent claims therefrom are patentable over Bowler and Tanaka for at least these reasons.

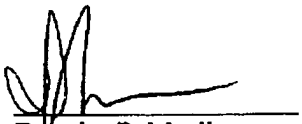
The rejection further contends that given that Bowler teaches that SOD gene expression in plastids increases environmental stress tolerance in the transgenic plant, one of ordinary skill in the art would have been motivated to express DNA construct of Bowler in any stress sensitive variety of rice including salt sensitive Indica rice varieties to obtain the environmental stress tolerant transgenic plants with reasonable expectation of success. However, as mentioned above, Bowler provides nothing beyond conjecture as to whether their constructs would be applicable to monocotyledonous plants. Further, Tanaka likewise fails to suggest that their studies would apply to any other rice varieties besides Sasanishiki. As such, Bowler and Tanaka represent nothing more than invitation to experiment. Accordingly, claim 1 and the dependent claims therefrom are further removed from Bowler and Tanaka, taken alone or together.

Favorable reconsideration and withdrawal of the rejection are respectfully requested.

In view of the above, favorable reconsideration in the form of a notice of allowance is requested. Any questions or concerns regarding this communication can be directed to the attorney-of-record, Douglas P. Mueller, Reg. No. 30,300, at (612) 455.3804.

Respectfully Submitted,

Dated: Jan. 18, 2008



DPM/ym

Douglas P. Mueller
Reg. No.: 30,300
Hamre, Schumann, Mueller & Larson, P.C.
225 South Sixth Street
Suite 2650
Minneapolis, MN 55402
612.455.3800